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Survey of Dall's Sheep in the Northern Richardson Mountains, June 2014

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ABSTRACT

An aerial survey of the Northern Richardson Mountains' Dall's sheep (*Ovis ovis dalli*) population was conducted between 22 June and 9 July, 2014. The helicopter survey was conducted by surveying the high mountain ridges, key post lambing habitat. In blocks establish in 1984, this area spans the border between the Northwest Territories (NWT) and Yukon Territory (YT).

A total of 496 sheep were observed, of which 404 were adult sheep and 92 were lambs. Of the adult sheep, 259 were nursery sheep and 112 were rams with 33 sheep unclassified. This is a decline in the size of the population compared to the last survey in 2010 (699 total sheep). Between 2010 and 2014, the annual rate of decline (λ) for the non-lamb portion of the population was 0.92.

The average lamb to nursery sheep and ram to nursery sheep ratios for this population were both healthy at 36:100 and 43:100, respectively. It is worth noting that these ratios varied among survey blocks.

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INTRODUCTION

The Northern Richardson Mountain Dall's Sheep population is a relatively small and isolated population at the northern end of the species range. Dall's sheep has a high cultural and traditional value for northern people. There is a small harvest of sheep from this population by the Gwich'in and Inuvialuit of the Northwest Territories and the Vuntut Gwich'in of the YT.

The Gwich'in Renewable Resources Board (GRRB), Government of the Northwest Territories (GNWT) and the Yukon Territorial Government (YTG) have been monitoring the Dall's sheep population by surveying every three to five years since the late 1980s. The current study area is show in Figure 1 with each block named by the biologists for ease of communication. The Sittichinli survey block was added in 1997, but no sheep have been observed in this block during surveys conducted since then. Surveys using the same survey method have been conducted in June 1984, June 1985, June 1986, August 1991, August 1997, June 2001, August 2003, June 2006 and June/July 2010 (summarized in Lambert Koizumi et al. 2011). During the August 1997 survey, a number of blocks on the west side of the study area, primarily the blocks that are outside the NWT could not be surveyed because of bad weather. Based on historic distributions, the total population was estimated to be 1,573; this is the highest recorded population size (Nagy and Carey 2013). The Dall's sheep population increased from 543 animals in 1984-1573 in 1997, a three-fold increase. Since 1997, the population declined to 699 in 2010 (Unpublished survey results).

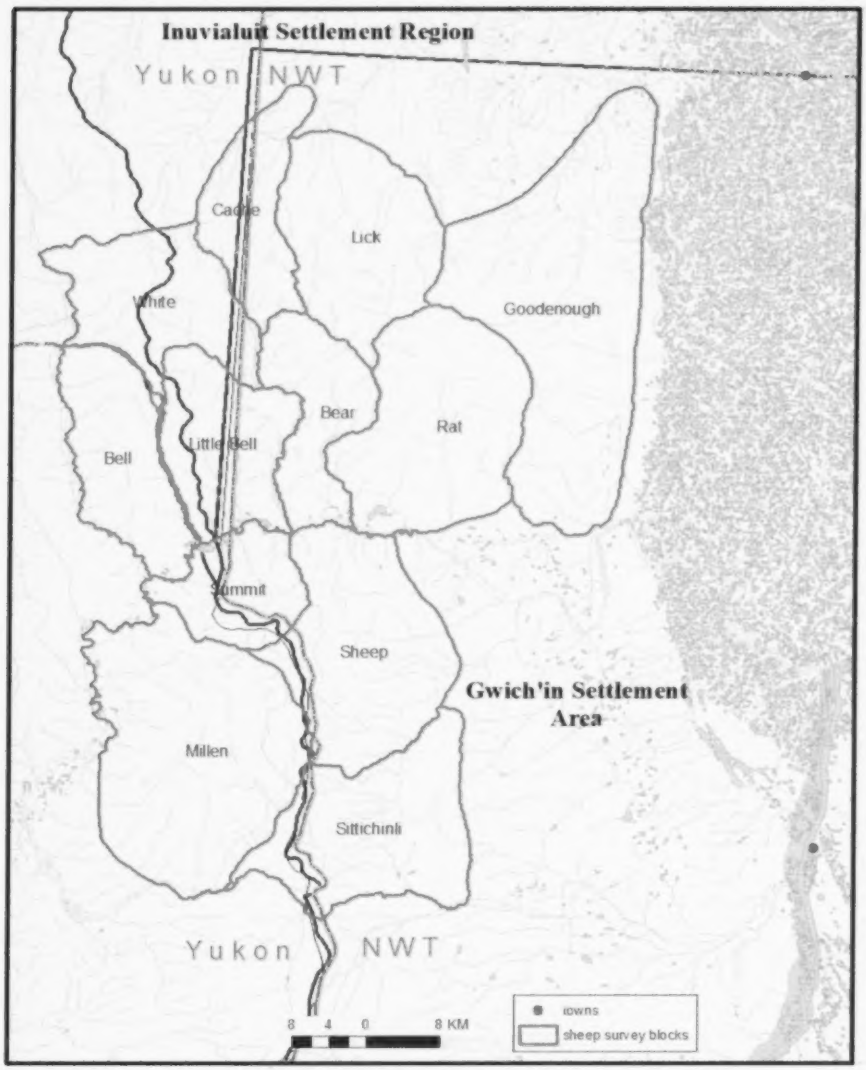

Figure 1. Study area and survey blocks in the Northern Richardson Mountains.

A draft management plan for the Dall's sheep in the Northern Richardson Mountains was drafted by an inter-jurisdictional working group (Management Plan for Dall's sheep in the Northern Richardson Mountains: 2008-2013). The management plan suggests regular survey frequencies of two to five years. The draft plan uses the population size to suggest management actions at different levels. At population below 500 sheep, with a declining trend the draft plan suggests more frequent population estimates, voluntary harvest restrictions of beneficiary harvest and legislative closure of all other hunting. Sheep

numbers below 350 calls for population surveys every two years and a legislated closure of all hunting.

METHODS

The survey was conducted post-lambing using an A-star helicopter based out of Inuvik, NWT. The survey blocks (Figure 1) were flown with focus on areas of sheep habitat, especially high ridges. Mountains were flown in a counter-clockwise direction. Survey crew consisted of a pilot, an observer/recorder beside the pilot and two observers in the back.

All observations were marked using a hand-held Garmin by the recorder. Sheep were classified as lambs, rams or nursery sheep by the recorder and additionally photos were taken to review afterwards in order to confirm or correct the classifications. Nursery sheep include ewes, yearling and young males that usually cannot be distinguished from ewes by air. Rams were classified as ¼, ½, ¾, or full curl based on horn size. Sheep that were unclassifiable, due to inaccessibility or safety issues for the crew or sheep were recorded as unclassified; if sex was distinguishable they were assigned to unknown nursery or unknown ram groupings.

Population total was considered all sheep observed. The number of lambs per 100 nursery sheep and rams per 100 nursery sheep was also calculated. Data was also summarized by blocks to compare the distribution of sheep between surveys at to look are more localized changes in the population. Growth rate (λ) was calculated using same formula as Lambert Koizumi et al (2011):

$$\lambda = \left(\frac{N_{t+T}}{N_t}\right)^{\frac{1}{T}}$$

A value of 1 for λ indicates a stable population, where above one indicates a growing population and below one a declining population.

Other wildlife sighted including grizzly bears (*Ursus arctos*), wolves (*Canis lupus*), caribou (*Rangier tarandus*), moose (*Alces americanus*), and muskoxen (*Ovibos moschatus*) were recorded.

RESULTS and DISCUSSION

The survey was flown between June 16 and 23, 2014. No flights were conducted June 17, 19 and 22 due to helicopter mechanical and weather issues. Good visibility with ceilings higher than the mountain peaks was necessary for the survey. Total flight time was 28.1 hours including ferry time, and flight lines are show in Figure 2.

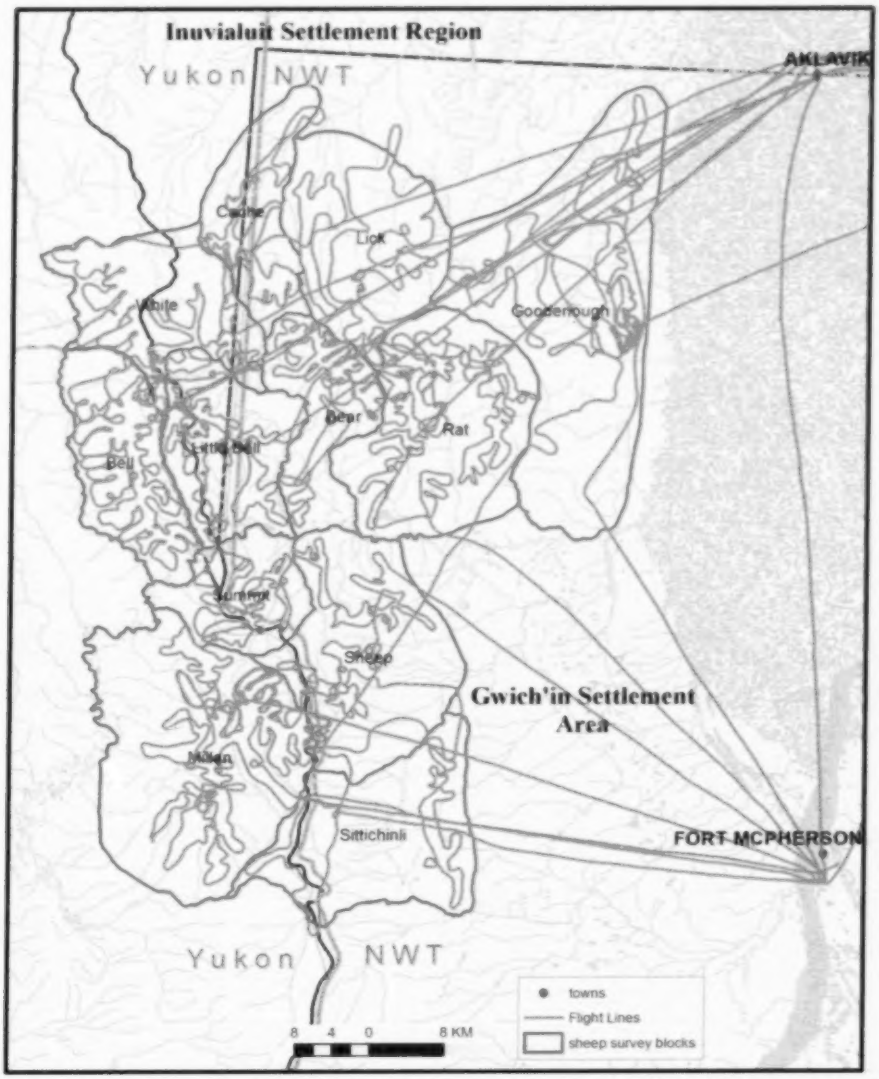

Figure 2. Flight lines recorded by global positioning system (GPS) during the June 2014 Northern Richardson Mountains sheep survey.

A total of 496 sheep were observed: 259 nursery sheep (ewes, yearlings, young rams), 92 lambs, 112 rams and 33 unclassified adult sheep. The location of sheep observations is show in Figure 3 and a breakdown of the number of sheep per block is reported in Table 1.

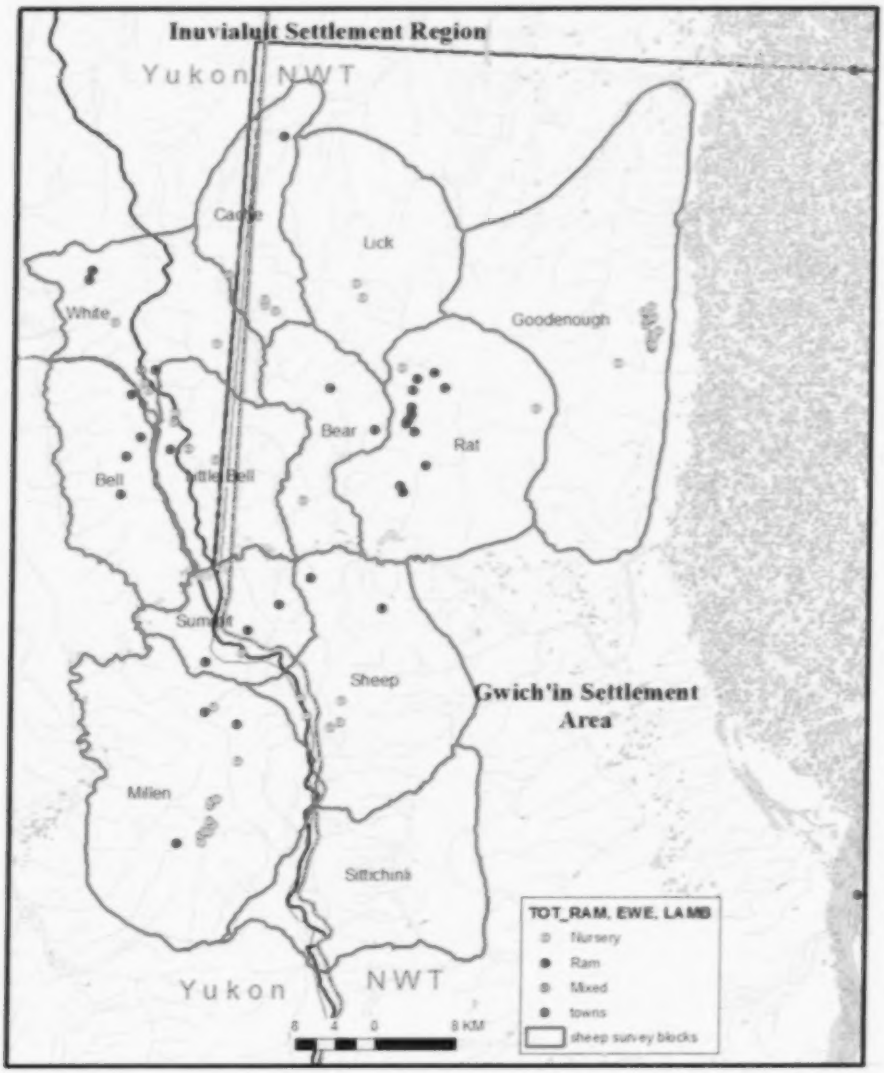

Figure 3. Sheep locations recorded by GPS during the June 2014 Northern Richardson Mountain sheep survey. Locations have been separated into ram or nursery/mixed group. Mixed groups are groups that had both nursery sheep and mature rams intermingled.

Table 1. Sheep population composition of the 2014 Northern Richardson survey area by survey block and date surveyed.

Date Surveyed	Block	Unk. Sheep	Total Ram	Nursery	Total Adult	Lamb	Total Sheep
16 June	White	2	10	45	57	14	71
18 June	Bear	0	5	3	8	3	11
16 June	Cache	0	1	35	36	9	45
16, 18 June	Lick	0	0	32	32	7	39
18 June	Little Bell	5	10	11	26	4	30
23 June	Millen	3	14	37	54	15	69
21 June	Rat	0	24	11	35	5	40
18 June	Summit	0	9	13	22	5	27
23 June	Goodenough	20	24	21	65	14	79
18 June	Bell	3	11	15	29	0	29
21 June	Sheep	0	4	36	40	16	56
21, 23 June	Sittichinli	0	0	0	0	0	0
	TOTAL	**33**	**112**	**259**	**404**	**92**	**496**

The 2010 population count of sheep in the Northern Richardson Mountains was 700 sheep. The grown rate (λ) of 0.92 indicates a declining population between 2010 and 2014 after being stable between 2006 and 2010 (λ = 1.00). The growth rate for this population of sheep has varied between 0.73 and 1.28 since 1984. The population size over time is shown in Figure 4 and Figure 5 shows changes in ram, nursery sheep and lambs over time.

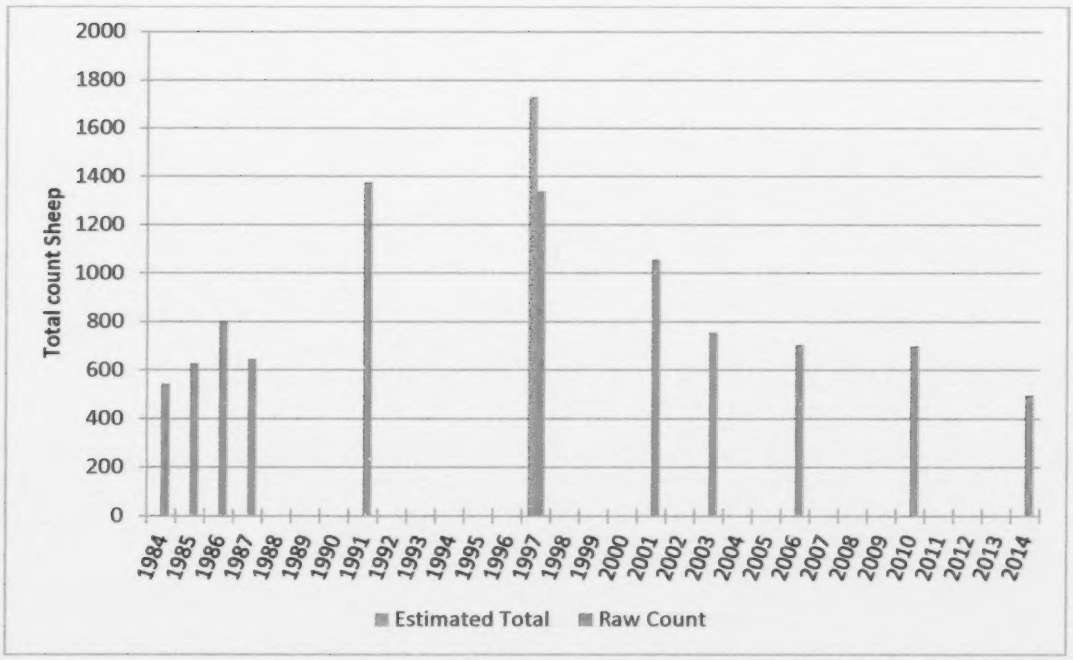

Figure 4. Sheep population size in the Northern Richardson Mountains Study Area, 1984-2010. In 1997 not all areas could be surveyed; estimated population size accounts for areas missed (Lambert Koizumi et al. 2011).

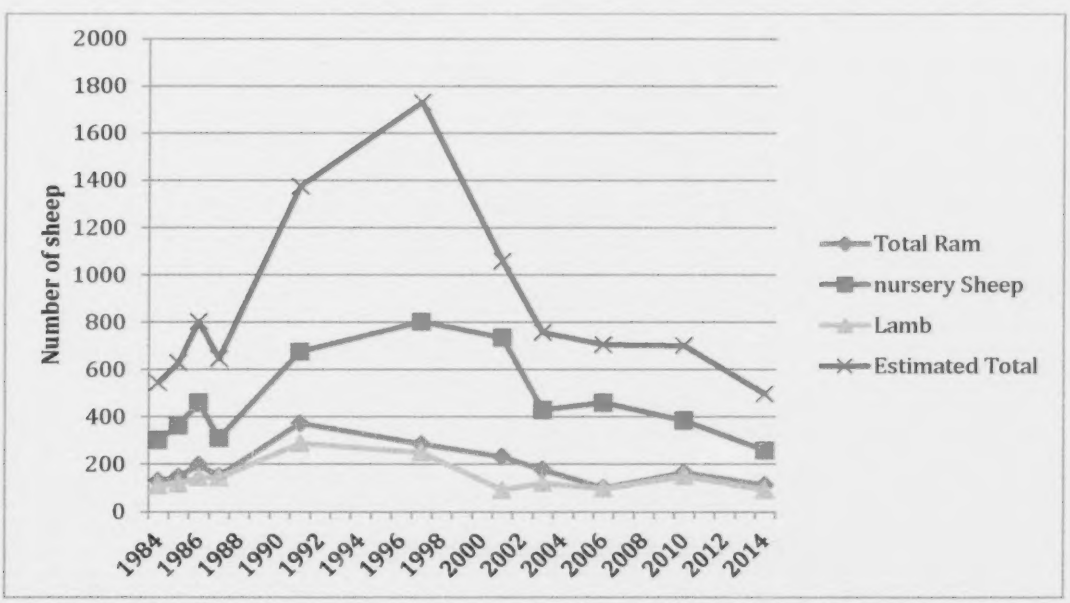

Figure 5. Total ram, nursery sheep, lamb and estimated abundance from surveys between 1984-2014 (1984-2006 summarized in Lambert Koizumi et al. 2011).

There was an increase in sheep in the white block and sheep survey block, the bell and Sittichinli survey blocks were same where the other survey blocks had a decline in the number of sheep. Lick had the largest decline from 124 sheep in 2014 to 39 sheep in 2014.

For the survey area, 35.5 lambs per 100 nursery sheep were observed. The number of lambs per 100 nursery sheep was lower in this survey than in 2010, with 39.1 lambs per 100 nursery sheep in 2010.

The number of lambs per 100 nursery sheep observed during each survey between 1984 and this survey is shown in Figure 6. The highest lamb ratios was 46.1 in 1987 and 42.8 in 1991 during a period of growth for this population.

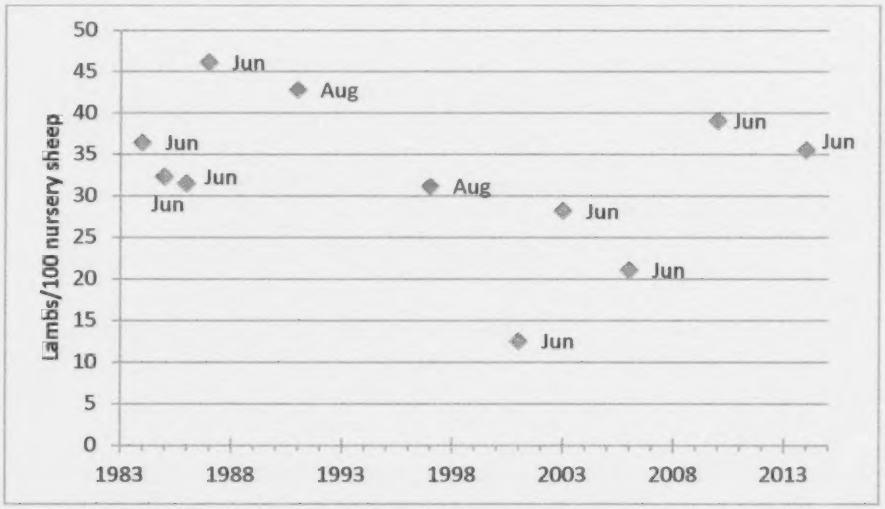

Figure 6. Lamb to 100 nursery sheep ratio in the Northern Richardson Mountains study area from 1984-2014 (1984-2006 summarized in Lambert Koizumi et al. 2011).

For the survey area, 43.2 rams per 100 nursery sheep were observed. In 2010 there were 42.7 rams per 100 nursery sheep; therefore ratio was slightly higher in this survey than in 2010. Ram per 100 nursery sheep ratio will be affected by the number of unclassified sheep. In 2010 survey there was 165 ram, 384 nursery, 150 Lambs and one unclassified sheep. These values are within the variation seen in this population in other surveys. The

number of rams per 100 nursery sheep observed during each survey between 1984 and this survey is shown in Figure 7. A ratio of 40-60 rams per 100 nursery sheep are considered normal that would not consider management concern (YT Renewable Resources 1996).

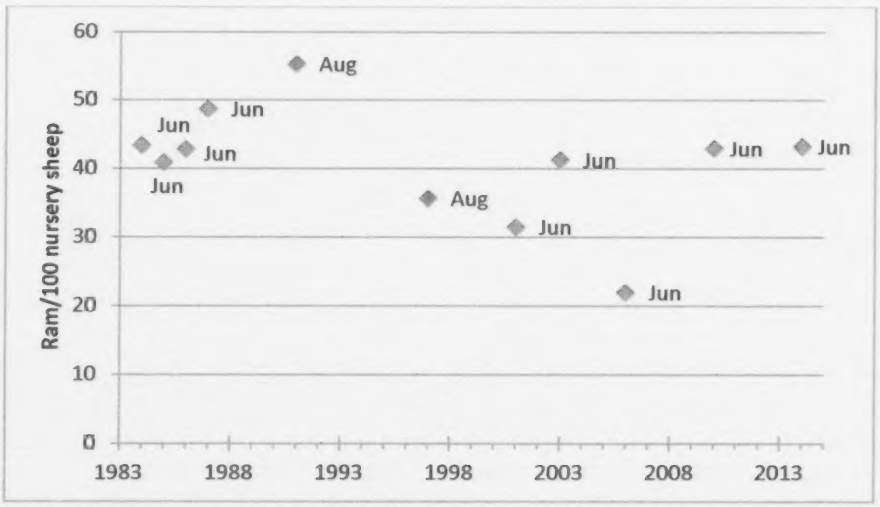

Figure 7. Ram to 100 nursery sheep ratio in the Northern Richardson Mountains study area from 1984-2014 (1984-2006 summarized in Lambert Koizumi et al. 2011).

We also observed 33 grizzly bears (20 adults and 13 cubs), one wolf, one wolverine, 71 muskoxen (57 adults and 14 calves), and 38 bull caribou (Figure 8).

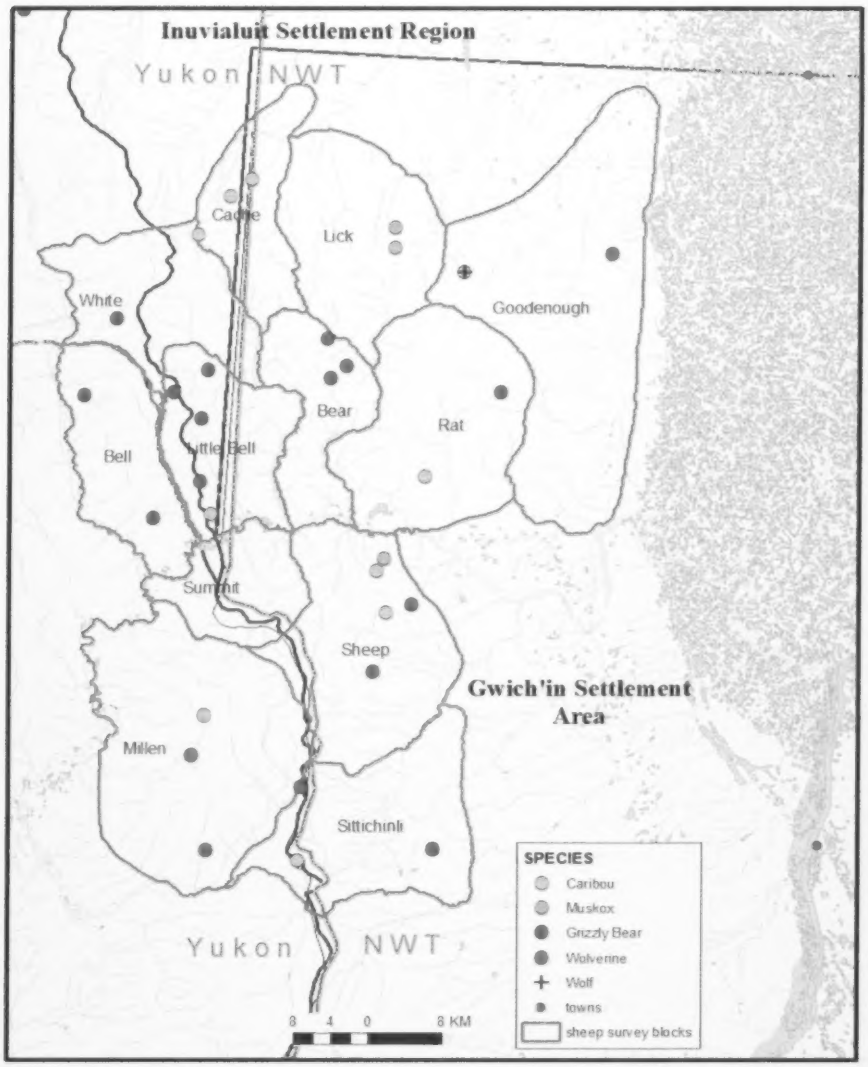

Figure 8. Observations of non-sheep large mammals during the June 2014 survey.

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